

Lichen diversity in Iberian beech forests, a tool to assess environmental status

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Goals

European beech forests have their southwestern limit in the Iberian Peninsula, where they have to cope with more limiting climatic conditions than in centre Europe. Therefore, beech forests use to grow in north facing slopes, in montane situations. In addition, they have been managed intensively, like almost all forest habitats in the peninsula. The effect that climate and management have on forest habitats has a strong influence on epiphytic communities, namely lichens. The sensitivity of lichens to changes in environmental conditions have been largely tested, placing them as one of the best candidates for being used as bioindicators. Here, epiphytic lichen diversity is applied to evaluate the effects of management and land use on the northeastern Iberian beech forests.

Material and methods

Epiphytic lichen diversity is evaluated based on terms of lichen diversity value (LDV) methodology. 41 sites were examined in the NE of the Iberian Peninsula. Apart from global diversity, the composition of lichen communities in terms of ecological traits, thallus morphology, photobiont and reproduction has been considered. Sites were classified attending to criteria of naturalness, based on global LDV, and perturbation, based on LDV of eutrophic species. Epiphytic lichen diversity was related with climate, structural variables and management and land use of sites.

Results

Beech forests host an epiphytic lichen community dominated by crustose, mesotrophic, mesohygrophytic and neutrophilous species. However, disturbances, such forest management or agriculture intensity, determines a shift in epiphytic lichen community promoting the abundance of eutrophic, xerophytic and basophilous species. The criterium of perturbation shows a distinct sites clustering, while the criterium of naturalness does not distinguish between sites.

Conclusions

Beech forests from the NE of the Iberian Peninsula have been enduring such management conditions, together with agricultural land use, that epiphytic lichen communities have remained in primal states of succession. Additionally, perturbations have promoted the increase in species linked to eutrophy and xerophily. The use of the criterium of naturalness does not give a real view on environmental quality of examined forests, because the increase in diversity resulted from species enhanced by perturbations. On the other hand, the application of a criterium based on the abundance of eutrophic species, used as a proxy of disturbances, has resulted in a more accurated evaluation of real situation.